

PAYMENT SYSTEMS IN KOREA

Korea

CONTENTS

List of abbreviations	228
Overview	229
1. Institutional aspects	230
1.1 Legal and regulatory framework	230
1.1.1 Payment instruments and systems	230
1.1.2 Securities settlement	231
1.2 Institutions	231
1.2.1 Providers of payment services	231
1.2.2 Providers of securities services	233
1.2.3 Other service providers	235
1.2.4 Role of other private and public sector bodies	235
2. Payment methods	236
Introduction	236
2.1 Cash	237
2.2 Cheques and bills	237
2.3 Funds transfers	238
2.4 Payment cards	238
3. Interbank settlement systems	239
Overview	239
3.1 BOK-Wire	240
3.1.1 Ownership	240
3.1.2 Participation	240
3.1.3 Type of transactions	241
3.1.4 Operation of the system	241
3.1.5 Settlement	241
3.1.6 Risk management	242
3.1.7 Pricing policies	242
3.1.8 Governance	242
3.2 Cheque Clearing System	242
3.2.1 Ownership	242
3.2.2 Participation	243
3.2.3 Type of transactions	243
3.2.4 Operation of the system	243
3.2.5 Settlement	244
3.2.6 Risk management	244
3.2.7 Pricing policies	244

3.2.8	Governance	244
3.3	Bank Giro System.....	244
3.3.1	Ownership.....	244
3.3.2	Participation.....	244
3.3.3	Type of transactions	245
3.3.4	Operation of the system	245
3.3.5	Settlement	246
3.3.6	Risk management.....	246
3.3.7	Pricing policies.....	246
3.3.8	Governance	246
3.4	Interbank Funds Transfer (IFT) System.....	246
3.4.1	Ownership.....	246
3.4.2	Participation.....	246
3.4.3	Type of transactions	246
3.4.4	Operation of the system	247
3.4.5	Settlement	247
3.4.6	Risk management.....	247
3.4.7	Pricing policies.....	247
3.4.8	Governance	247
3.5	Interbank CD/ATM System.....	248
3.5.1	Ownership.....	248
3.5.2	Participation.....	248
3.5.3	Type of transactions	248
3.5.4	Operation of the system	248
3.5.5	Settlement	248
3.5.6	Risk management.....	249
3.5.7	Pricing policies.....	249
3.5.8	Governance	249
3.6	Electronic Funds Transfer at the Point of Sale System.....	249
3.6.1	Ownership.....	249
3.6.2	Participation.....	249
3.6.3	Type of transactions	249
3.6.4	Operation of the system	250
3.6.5	Settlement	250
3.6.6	Risk management.....	250
3.6.7	Pricing policies.....	250
3.6.8	Governance	250
3.7	Electronic Banking System.....	250

3.7.1	Ownership.....	250
3.7.2	Participation.....	250
3.7.3	Type of transactions.....	251
3.7.4	Operation of the system.....	251
3.7.5	Settlement.....	251
3.7.6	Risk management.....	251
3.7.7	Pricing policies.....	252
3.7.8	Governance.....	252
3.8	Other retail payment systems.....	252
3.9	Major projects and policies being implemented.....	252
3.9.1	Development of e-money.....	252
3.9.2	Discouragement of promissory note usage.....	253
3.9.3	Structuring legal framework of electronic financial transactions.....	253
3.9.4	Development of B-to-B e-commerce payment system.....	254
4.	Securities settlement systems.....	254
	Introduction.....	254
4.1	Stocks.....	255
4.1.1	Trading.....	255
4.1.2	Pre-settlement.....	257
4.1.3	Settlement.....	257
4.2	Bonds.....	259
4.2.1	Trading.....	259
4.2.2	Pre-settlement.....	259
4.2.3	Settlement.....	260
4.3	Major projects and policies being implemented.....	261
4.3.1	Reconstruction of securities settlement infrastructure.....	261
4.3.2	Introduction of DVP in central bank money.....	261
4.3.3	Shortening of settlement cycle.....	261
5.	Role of the central bank.....	262
5.1	Provision of settlement facilities.....	262
5.2	Operation of payment systems.....	263
5.3	Operation of securities registration systems.....	263
5.4	Oversight.....	263
	Statistical tables.....	265

List of abbreviations

ATM	automated teller machine
BOK	Bank of Korea
BOK-Wire	Bank of Korea Financial Wire Network
CD	cash dispenser
CMS System	Cash Management Service System
EFTPOS System	Electronic Funds Transfer at the Point of Sale System
FSC	Financial Supervisory Commission
FSS	Financial Supervisory Service
FTC	Fair Trade Commission
GBM	General Bond Market of the KSE
IDM	Inter-dealer Market of the KSE
IFT System	Interbank Funds Transfer System
KFTC	Korea Financial Telecommunications and Clearings Institute
KOSDAQ	Korea Securities Dealers Association Automated Quotation
KOSPI	Korea Composite Stock Price Index
KSD	Korea Securities Depository
KSDA	Korea Securities Dealers Association
KSE	Korea Stock Exchange
KSFC	Korea Securities Finance Corporation
MPC	Monetary Policy Committee of the BOK
MSB	Monetary Stabilization Bond issued by the BOK

Overview

Payment services in Korea are provided by various kinds of institutions including banks and non-bank financial institutions. Banks are the most important provider of payment services since they have the legal and institutional advantage in receiving deposits from the public. Bank deposits provide the basis for most payment transactions. Post offices and credit unions also offer payment services to a limited extent. All interbank obligations resulting from retail payments such as cheques and electronic funds transfers are cleared on a multilateral net basis by the Korea Financial Telecommunications and Clearings Institute (KFTC), a non-profit organization which is owned by member banks, and are finally settled across banks' accounts at the Bank of Korea (BOK). Large-value payments between banks are directly settled on a real-time gross basis through BOK-Wire, a large-value funds transfer system operated by the BOK.

All electronic retail payment systems in Korea feature nationwide interbank shared networks, which enable customers to use any bank for their retail payments such as bank giro and funds transfers, irrespective of the banks at which they themselves do business. This is largely due to the early establishment of the Financial Sector Informationalization Promotion Committee, in which all banks participate.

As in many other countries, the payment and settlement arrangements in Korea have been changing significantly in recent years. Payment arrangements previously based almost exclusively on cash and paper-based payment instruments have been changing to electronic payment arrangements at a rapid rate, especially since electronic networks for small-value funds transfers were introduced in the late 1980s. Furthermore, in December 1994 the launch of BOK-Wire, an RTGS system for large-value funds transfers, substantially transformed the structure of the Korean payment systems. As a result, electronic payments during 2001 made up more than 60% by volume of all non-cash payments.

In 1998, the framework of monetary and financial supervisory policies in Korea changed greatly in the face of financial crisis. According to the amended *Bank of Korea Act*, the Bank of Korea was given full responsibility for monetary policy. In addition, the BOK took explicit responsibility for operating and managing the payment systems although it had managed payment and settlement arrangements in Korea prior to amendment of the Act. On the other hand, the BOK's responsibility for supervising banking institutions was transferred to the Financial Supervisory Commission (FSC) and the Financial Supervisory Service (FSS), newly consolidated financial supervisory institutions.

Meanwhile, the Korea Stock Exchange market, established in 1956, experienced a rapid growth in the 1970s as a result of the government's policy of encouraging companies to go public. This expansion led to demands for more efficient securities settlement arrangements, replacing the existing physical delivery system. To this end, the Korea Securities Depository (KSD), a central securities depository, was established in 1974, and began operation of the securities settlement system based on book-entry transfers and centralized deposits. KSD is currently in charge of settlements for all transactions in the Korean securities markets – the Korea Stock Exchange (KSE), Korea Securities Dealers Association Automated Quotation (KOSDAQ) and over-the-counter markets.

Two organized exchanges – the KSE and KOSDAQ markets – use multilateral net settlement to reduce participants' settlement amounts. Settlements of stock trades on the exchanges occur two days after the trade dates, while bonds are settled on the trade dates. Bonds traded

in the over-the-counter market, featuring wholesale trades between large institutional investors, are settled on a trade-by-trade basis on the trade date.

1. Institutional aspects

1.1 Legal and regulatory framework

1.1.1 Payment instruments and systems

In Korea, various areas of payment and settlement are governed by a number of separate laws and regulations. In December 1997, the sixth amendment to the *Bank of Korea Act* explicitly provided the Bank of Korea with a legal basis for its operation and management of national payment systems. Under the Act, the Monetary Policy Committee of the BOK formulates the basic policy on oversight of payment systems and operation of BOK-Wire. The Bank of Korea operates the BOK-Wire system, oversees payment systems and develops new payment arrangements to ensure the safety and efficiency of payment and settlement in Korea. In addition, the *Bank of Korea Act* stipulates that the Bank of Korea has the sole right of issuing banknotes and coins and can provide settlement accounts for banks and non-bank institutions.

The *General Banking Act* is the basic law regulating banking institutions. The Act regulates all aspects of banking business such as authorization to conduct banking business, ceilings on securities investment and scope of business. The Act also stipulates that only commercial banks may provide chequing accounts for customers.

As the laws governing the most popular paper payment instruments in Korea, the *Bills of Exchange and Promissory Notes Act* and the *Cheques Act* set out the ways in which bills of exchange, promissory notes and cheques are to be issued, accepted and paid. The *Specialized Credit Financial Business Act* regulates all aspects of credit, debit and prepaid cards. Bank giro and other interbank funds transfers are regulated by institutional arrangements among KFTC member banks.

As electronic payments have rapidly become popular with technological advances, there has recently been a need for legislation to support construction and promotion of safer and more reliable electronic payment arrangements. The *Framework Act on Informationalization Promotion* was enacted in 1995 to set the development of an information-oriented society as a national strategic priority. Under the Act, the Financial Sector Informationalization Promotion Committee, encompassing the banking, securities and insurance industries, was established to facilitate the introduction of various electronic payment services and to formulate safety measures for the financial network. In addition, the *Framework Act on Electronic Commerce* and the *Digital Signature Act* were signed into law in 1999, giving legal certainty to paperless electronic documents and digital signatures used in e-commerce.

There are several laws which ensure fair competition and customer protection. In accordance with the *Act Concerning the Establishment of the Financial Supervisory Organization*, the Financial Supervisory Service (FSS) has the responsibility for consumer protection related to the provision of all financial services, as well as for arbitrating financial disputes between individual consumers and financial institutions.

The *Monopoly Regulation and Fair Trade Act*, stipulating prohibition of collusive practices and anti-competitive transactions in all kinds of business, is also applied to payment transactions. The Act prohibits conduct restricting fair competition such as price agreements and monopolies in the area of payment and settlement services. In addition, according to the *Regulation of Standardized Contracts Act*, financial institutions are prohibited from having unreasonably unfair clauses in their standardized contracts prepared in advance for customers to whom they provide payment services such as deposit, payment cards and electronic banking.

1.1.2 Securities settlement

The *Securities and Exchange Act*, enacted in 1962, is the basic law governing the securities market in Korea. The Act deals with securities issuances, trading, settlement and risk controls, and regulates the business activities of securities companies and conduct of securities-related institutions. Under the Act, the Korea Securities Depository (KSD) is given the sole right of settling securities on a book-entry transfer basis. In order to enhance the efficiency of securities deposit and settlement, securities companies, futures companies and investment trust companies are required to deposit with KSD not only their own securities holdings but also those of their customers.

The practical operations of trading, clearance, settlement, access to systems, and risk control arrangements are mostly delegated to self-regulatory institutions and settlement system operators such as the Korea Stock Exchange, the Korea Securities Dealers Association and KSD. Nevertheless, the *Securities and Exchange Act* stipulates that these institutions and operators are required to obtain prior approval from the Financial Supervisory Commission when they establish, amend or abolish their internal regulations on practical operations.

1.2 Institutions

1.2.1 Providers of payment services

Payment services generally comprise payment instrument access services, clearing services, and settlement services. Instrument access services in Korea are provided mostly by banks, although there are other financial institutions providing them as well. Clearing services for cheques and electronic payments are performed by the Korea Financial Telecommunications and Clearings Institute (KFTC), owned by member banks. Settlement services are provided by the Bank of Korea.

In the wake of the financial crisis of 1997, the Korean government initiated a policy of closing down financial institutions which were no longer viable due to accumulated non-performing loans, which was considered to have partly caused the crisis. As a result, the total number of banks in Korea was reduced by eleven between 1998 and 2000, through exit or merger, and 500 other financial institutions were also closed down, as shown in Table 1. The institutions remaining have undertaken restructuring efforts to achieve large cost reductions. In the field of payment services, many financial institutions are currently encouraging a movement in transactions away from costly tellers' services to less costly automated services such as Internet banking and automated teller machines, through policies of service fee discrimination.

Table 1: Change in the Number of Financial Institutions during 1998-2000

	End of 1997 ¹⁾	January 1998 ~ December 2000			End of 2000 ¹⁾
		Exit ²⁾	Merger ³⁾	Newly established	
Banks	33	5	6	-	22
Merchant banking corporations	30	18	3	1	10
Mutual savings banks	231	71	25	12	147
Credit unions	1,666	257	101	9	1,317
Securities companies	36	6	1	14	43
Investment trust companies	31	6	1	3	27
Insurance companies	45	5	6	-	34
Total	2,072	368	143	39	1,600

1) Excluding branches of foreign institutions.

2) Including revocation of license, bankruptcy and liquidation.

3) Number of institutions ceasing to exist following mergers.

Banks

There are two types of banks operating in Korea: commercial banks and specialized banks. Commercial banks are operated according to the *General Banking Act*, while specialized banks are regulated by their own individual acts.

Commercial banks focus on the businesses of deposit taking, lending, payment and settlement. Payment services in Korea are mostly provided by commercial banks: provision of chequing accounts; issuance of cashier's cheques; interbank funds transfers; credit and debit card services; bank giro, etc. Foreign bank branches are generally specialized in the wholesale banking business; however, in accordance with gradual deregulation, some foreign bank branches are expanding their operations into retail banking. Commercial banks in Korea consisted of nine nationwide commercial banks, six regional banks, and 62 foreign bank branches as of the end of December 2001.

Specialized banks were established mostly in the 1960s to support special sectors given priority in Korea's economic development – exports, social infrastructure construction, housing, etc. With subsequent changes in the financial environment, however, some specialized banks have been changed to commercial banks, and the others have expanded their scopes of business into commercial banking areas. Most specialized banks now provide much the same payment services as commercial banks do. As of the end of December 2001, there were five specialized banks in Korea.

Mutual savings banks / Credit unions

Mutual savings banks were created to help channel small depositors' funds from the unregulated private market into the organized financial market. As of December of 2001, the

number of mutual savings banks has fallen from 231 in 1997 to 122 in accordance with the government policy of closing down ailing financial institutions.

Credit unions were organized in order to help facilitate financing for their members and to promote mutual economic benefits. As of the end of December 2001, there were 1,268 credit unions in Korea.

In September 2001, mutual savings banks and credit unions acquired approval from KFTC to participate in some retail payment networks, such as the Interbank Funds Transfer, CD/ATM, Bank Giro and Electronic Banking Systems. Accordingly, mutual savings banks and credit unions are able to directly offer some retail payment services to their customers without firm-banking arrangements with banks. Mutual savings banks and credit unions, however, do not provide credit and debit card services, and do not issue their own cheques (cashier's cheques). As mutual savings banks and credit unions are not allowed to provide chequing accounts for their customers either, customers are unable to draw cheques on their accounts with these institutions.

Credit card companies

There are three bank-affiliated credit card companies and four specialized credit card companies in Korea. All banks in Korea offer services such as issue of cards, settlement of card bills and maintenance of merchant networks, under arrangements with credit card companies. Credit card companies also provide cardholders with cash advance services up to limited lines of credit.

Post Office

As the Post Office has participated in most interbank payment systems since 1995, it provides much the same payment services as banks through its 2,800 branches across the nation. The Post Office issues its own cheques (cashier's cheques) and postal money orders, and provides interbank funds transfers, giro and CD/ATM services. The Post Office does not provide chequing accounts.

1.2.2 Providers of securities services

Securities companies

Securities companies deal securities for their own accounts, and provide securities brokerage and underwriting services, acting as intermediaries for their customers. Subject to obtaining prior permission from the Financial Supervisory Commission (FSC), securities companies also conduct the businesses of lending funds or securities, providing investment advisory services and guaranteeing payment of corporate bonds. Most securities companies provide their customers with interbank funds transfer services under firm-banking arrangements with major banks.

Since direct participation in organized exchanges in Korea is principally allowed to securities companies only, other institutions and individual customers must trade, settle and deposit securities through securities companies. As of the end of December 2001, there were 64 securities companies operating in Korea.

Investment trust companies / Securities investment companies

Investment trust companies (ITCs) in Korea operate contractual-type investment funds. ITCs sell their beneficiary certificates to customers through their own branches or securities companies, and invest in stocks and bonds. As of December 2001, there were 30 ITCs in Korea.

Securities investment companies (SICs) manage corporate-type investment funds, similar to US mutual funds. SICs sell their own shares to customers through distributors such as securities companies and banks, and invest in diversified portfolios of securities. Currently, only closed-end funds are permitted, with open-ended funds scheduled to be introduced in 2003. Both ITCs and SICs trade and settle securities in the exchanges through the brokerage of securities companies.

Korea Stock Exchange

The Korea Stock Exchange (KSE), established in 1956, is a self-regulatory organization owned and operated by its members to maintain a fair and orderly market. The KSE sets up rules for trading, settlement and member supervision in the KSE market. As of the end of December 2001, the KSE had 53 members including 14 foreign securities companies.

The KSE operates three cash markets, for stocks, government bonds and other bonds, along with two derivatives markets for KOSPI (Korea Composite Stock Price Index) 200 futures and KOSPI 200 options¹. Securities traded in each sub-market are settled separately through its respective settlement system.

In accordance with the *Securities and Exchange Act*, the KSE acts as a central counterparty in the KSE market and has a legal responsibility for clearance and settlement of all KSE market transactions. However, the KSE has entrusted the operation of its settlement systems to the Korea Securities Depository (KSD), the central securities depository in Korea, under an agreement on settlement agency services between the two institutions since 1975. Accordingly, settlements in the KSE markets have actually been handled by KSD, while the KSE is in charge of the clearing process only.

Korea Securities Depository

The Korea Securities Depository (KSD) was established as a special purpose company under the *Securities and Exchange Act* in 1974. KSD is owned by about 100 institutions including the KSE, the Korea Securities Dealers Association, securities companies, banks, insurance companies, etc. The largest shareholder is the KSE, which holds more than 70% of total shares.

As the sole central securities depository in Korea, KSD provides depository and settlement services for stocks and bonds in all Korean markets - the KSE, KOSDAQ and OTC markets. In addition, KSD provides services such as bond registration, and brokerage of securities lending.

¹ The KOSPI 200 is a market value weighted index which consists of 200 stocks selected from the KSE market. It is used as an underlying index for futures and options transactions in the KSE market.

1.2.3 Other service providers

Korea Securities Finance Corporation

The Korea Securities Finance Corporation (KSFC) engages in securities financing in the primary and secondary securities markets. The KSFC lends funds for underwriting, working capital and stock purchases, and provides loans and securities for margin transactions. For the protection of customers' interests, securities and futures companies are required to deposit customers' deposits at the KSFC, in accordance with the *Securities and Exchange Act* and the *Futures Trading Act*.

Korea Securities Dealers Association

The Korea Securities Dealers Association (KSDA) is a self-regulatory body operated by its members, or securities companies. The KSDA manages the KOSDAQ and OTC markets, and ensures fair trading practices. The KOSDAQ Committee established in the KSDA makes basic policies related with access, trading, settlement, risk control and disclosure in the KOSDAQ market.

1.2.4 Role of other private and public sector bodies

Financial Supervisory Commission / Financial Supervisory Service

In accordance with the *Act on Establishment of Financial Supervisory Organizations*, the Financial Supervisory Commission (FSC) was established in 1998 as the nation's sole financial supervisor, whose responsibility encompasses all financial institutions and other related institutions in Korea. The FSC has taken over almost all supervisory powers from former industry-specific supervisors to create a consolidated financial supervision system.

The FSC sets up the basic policies related with supervision of financial institutions and the securities markets. The FSC is additionally responsible for the special task of implementing and overseeing the restructuring process in the Korean financial and corporate sectors, in order to create a more competitive and sounder financial system.

In order that the supervisory role of the FSC is effectively carried out, the Financial Supervisory Service (FSS) was established within the FSC's jurisdiction as the executing body. The FSS performs inspection and examination of all financial institutions in Korea, and, under approval from the FSC, can request dismissal of an institution's management or suspension of the institution's business. The FSS also acts as an arbitrator in disputes between financial institutions and their customers. The Financial Dispute Settlement Committee (FDSC), established in the FSS, is the supreme mediation body for resolving financial disputes. Its arbitration proposal has the same effect as a judicial compromise made by a court of law, if the parties concerned accept it. The FDSC, chaired by one of the Deputy Governors of the FSS, consists of members from various consumer groups and legal circles.

Fair Trade Commission

The Fair Trade Commission (FTC) is Korea's competition regulator. It is responsible for removing anti-competitive regulations and lowering economic concentration in all areas of the economy including payment and settlement. It prohibits financial institutions from making collusive pricing policy and imposing unfair terms in their service contracts. It also has the authority to order corrections and to impose penalty charges on violators.

Financial Sector Informationalization Promotion Committee

In accordance with the *Framework Act on Informationalization Promotion*, the Financial Sector Informationalization Promotion Committee, one of 23 sub-committees under the government's Informationalization Promotion Committee, supports construction of the nationwide financial networks.

The Committee, chaired by the Deputy Governor of the Bank of Korea, consists of delegates from the banking, insurance and securities industries. It sets up basic policies, selects joint projects, evaluates performance, and formulates safety measures for the effective promotion of financial electronic networks. Most electronic payment arrangements in Korea, such as the interbank shared networks, cheque truncation and K-CASH (e-money), were introduced by initiation of the Committee.

Korea Financial Telecommunications and Clearings Institute (KFTC)

The Korea Financial Telecommunications and Clearings Institute (KFTC) is a non-profit organization which was set up on a joint-ownership basis by member banks including the Bank of Korea in June 1986.

KFTC is the operator of all retail payment systems in Korea. Retail payments such as cheque and CD/ATM transactions are netted out on a multilateral basis for the operational efficiency of the systems. KFTC verifies retail payment information, calculates the interbank net obligations of members and makes a request for final settlement to the Bank of Korea. In addition, KFTC operates a SWIFT (Society for Worldwide Interbank Financial Telecommunication) Access Point, connecting financial institutions in Korea to the SWIFT network and acting as a national secretariat for National Member Groups and User Groups. KFTC is also committed to the standardization of message formats, banking codes and communication protocols related with electronic banking.

KFTC has three classes of membership: general, associate and special. Both general and associate members are entitled to participation in all retail payment systems operated by KFTC. General members, however, have voting rights in the General Meeting, the KFTC's supreme decision-making body, while associate members are unable to participate in the decision-making process. Only banks are eligible for general and associate membership. The Bank of Korea is also a general member of KFTC. Financial institutions that want to join one or more specific systems are able to obtain special memberships under approval of the General Meeting. The costs of running KFTC are met by members' admission fees, annual basic fees and transaction fees based on their usage.

As of the end of December 2001, there were 12 general members, 12 associate members, and 14 special members.

2. Payment methods

Introduction

There are various payment instruments and services used in Korea today. However, recent trend shows that credit cards and electronic funds transfers have become more popular, while cheque usage has been decreasing. As shown in Table 2, the share of electronic funds

transfers among non-cash retail payments in Korea has increased from 8% to 41% while the share of cheques and bills has decreased from 75% to 25% in the last ten years. Considering that the efficiency of a payment system depends on how rapidly and cost-effectively payments and settlements are completed, it would appear that the expanded use of payment cards and electronic funds transfers has contributed greatly to the efficiency of payment systems in Korea.

Table 2: Share of Non-cash Retail Payments

(percentage of total volume)

	1991	1995	1997	1998	1999	2000	2001
Paper-based payments	87.3	67.1	59.5	52.1	47.4	41.7	36.4
<i>Cheques & bills</i>	74.6	50.1	45.0	39.0	35.9	30.8	24.9
<i>Funds transfers</i>	12.7	17.0	14.5	13.1	11.5	10.9	11.5
Electronic payments	12.7	32.9	35.8	40.5	47.9	52.6	63.6
<i>Funds transfers</i>	7.5	22.5	25.9	30.7	37.1	39.4	40.7
<i>Payment cards</i>	5.2	10.4	9.9	9.8	10.8	13.2	22.9

2.1 Cash

Cash is still widely used in Korea, owing to its intrinsic convenience for small-value transactions as well as to Koreans' traditionally strong preference for cash. Banknotes and coins are issued solely by the Bank of Korea and cannot be refused, as legal tender, in any transactions. In Korea, banks are allowed to include their banknote holdings as part of their required reserves against customers' deposits.

Currently, the BOK issues banknotes in three denominations – KRW 1,000, KRW 5,000, and KRW 10,000, and coins in six denominations – KRW 1, KRW 5, KRW 10, KRW 50, KRW 100, and KRW 500. At the end of 2001, the total value of banknotes and coins issued amounted to KRW 22 trillion (about USD 17 billion), and KRW 1 trillion (about USD 0.8 billion), respectively. By value, around 85% of banknotes and coins are circulating outside banks.

2.2 Cheques and bills

Cheques and bills were the most popular non-cash payment instruments until the mid-1990s, and virtually the only means of non-cash payment until the 1980s. Cheques and bills still remain a common payment instrument, even though their share in total payments has been decreasing due to the recent expansion of electronic payments. In 2001, cheques and bills cleared through the clearing houses nationwide totaled KRW 5,803 trillion (around USD 4.5 trillion) by value and 1,094 million by volume, representing 67% by value and 25% by volume of all non-cash retail payments.

Various types of cheques and bills are currently used in Korea, namely cashier's cheques, current account cheques (corporate cheques), household cheques, promissory notes, etc. Among these cheques, cashier's cheques drawn by a bank on itself are most widely used, like cash, because they can be both cashed instantly at any bank and the highest denomination of banknote in Korea is only KRW 10,000, worth less than USD 10. There are four types of preset-value cashier's cheques used in Korea, among which the KRW 100,000-denomination

is the most popular as a substitute for banknotes. By volume, cashier's cheques account for 98% of all cheques and bills cleared through the clearing houses, and the KRW 100,000-denomination cashier's cheques make up around 80%.

Current account cheques and promissory notes drawn by companies on their chequing accounts are used mainly for large-value business transactions. In 2001, the clearing value of current account cheques and promissory notes totaled KRW 3,574 trillion (around USD 2.7 trillion), representing more than 60% of all cheques and bills by value. Promissory notes cause problems of the deferred payments and the default risk and aggravates small companies' financial burden. The BOK and the banking industry have established substitute payment schemes such as corporate procurement loans and corporate purchase cards in order to reduce the use of promissory notes (see section 3.9.2).

Household cheques for individual customers were first introduced in 1981 to reduce cash usage and to substitute for cashier's cheques, but their use has decreased substantially in recent years due to the development of electronic payment instruments as well as the default risk. In 2001, household cheques represent only 0.4% of all cheques and bills by volume.

2.3 Funds transfers

A fund transfer enables a payer to transfer funds to a payee's account without any exchange of cash or cheques. Funds transfers in Korea include credit transfers and debit transfers in which funds are transferred on the payment order of the payer and payee, respectively.

In Korea, credit transfers are available through various retail payment systems. Credit transfers with regular frequency, such as installment sales, tax, and public utilities payments, are made through the Bank Giro System. It takes two or three days for a payee to receive funds transferred under the Bank Giro System. Credit transfers for general-purpose payments, with irregular frequency between individuals, are executed through the interbank shared networks, such as the IFT (Interbank Funds Transfer), the CD/ATM and the Electronic Banking Systems. In the Electronic Banking Systems, payments are made using telebanking, Internet banking and mobile banking. In contrast to the Bank Giro System, the shared networks enable payees to receive cash instantly after payers transfer funds. In year 2001, credit transfers totaled 1,968 million, with a value of around KRW 2,549 trillion (about USD 2 trillion), which represented around 45% of all non-cash retail payments by volume, and 30% by value.

Debit transfers for public utilities and insurance payments, which are pre-authorized by the payer, are currently available through the Bank Giro System only. In year 2001, debit transfers totaled 329 million by volume and KRW 23 trillion (approximately USD 18 billion) by value, representing 7.5% by volume and 0.3% by value of all non-cash retail payments, respectively.

2.4 Payment cards

Credit cards

Credit cards, which were first introduced in 1969, are used widely in small-to-medium-value transactions in Korea. Most cards are affiliated with VISA and MasterCard for international use. With the credit cards, cardholders can purchase not only goods and services with an interest-free billing period of up to 56 days, but also obtain cash advances instantly up to the pre-arranged limits via CD/ATM.

The share of credit cards among non-cash retail payments has increased significantly, by about 4 times, over the last ten years. This result has come mainly from the credit card companies' aggressive expansion strategies such as offering exemptions from annual fees and loyalty reward programs. In addition, the government introduced tax deductions and a lottery scheme for credit card purchases in 1999, to encourage credit card usage and obtain the exact sales records of merchants for taxation purposes.

During the year 2001, the total value of credit card purchases was about KRW 176 trillion (about USD 135 billion), and the cash advances totaled KRW 268 trillion (about USD 205 billion). As of the end of 2001, there were 89 million credit cards issued in Korea, which indicates that each person aged 18 or over, who is eligible to be issued a card in Korea, holds 2.5 cards on average.

Debit cards

Debit cards, which were introduced in 1996, allow their holders to purchase goods and services in affiliated retail shops. Payments are debited immediately from the accounts of the cardholders and are credited on the next business day to the accounts of retailers through the point-of-sale (POS) terminal. Debit cards are also used for cash withdrawals from cash dispensers (CDs) and automated teller machines (ATMs).

Debit cards are not widely used in Korea mainly because most applicants, irrespective of their creditworthiness, have no difficulty obtaining credit cards, a close substitute for debit cards. Owing to the intensive competition among credit card companies, credit cards are usually even issued to students and housewives with no regular incomes, thus removing potential debit card demand. In 2001, payments by debit cards totaled less than 2 million by volume, representing only 0.04% of all non-cash retail payments.

Prepaid cards

Single-purpose prepaid cards with embedded magnetic stripes were first introduced in 1994. The maximum stored value on a prepaid card is KRW 500,000. Telephone and public transportation (bus & subway) cards of this type are becoming very popular.

E-money called K-CASH, a general-purpose prepaid card, was first developed in 2000, and other types of e-money, Mondex cards and Mybi cards, were introduced afterward. An e-money card stores the maximum value of KRW 500,000 in an embedded IC (integrated circuit) chip. E-money is still in its trial stage and is not widespread yet in Korea.

3. Interbank settlement systems

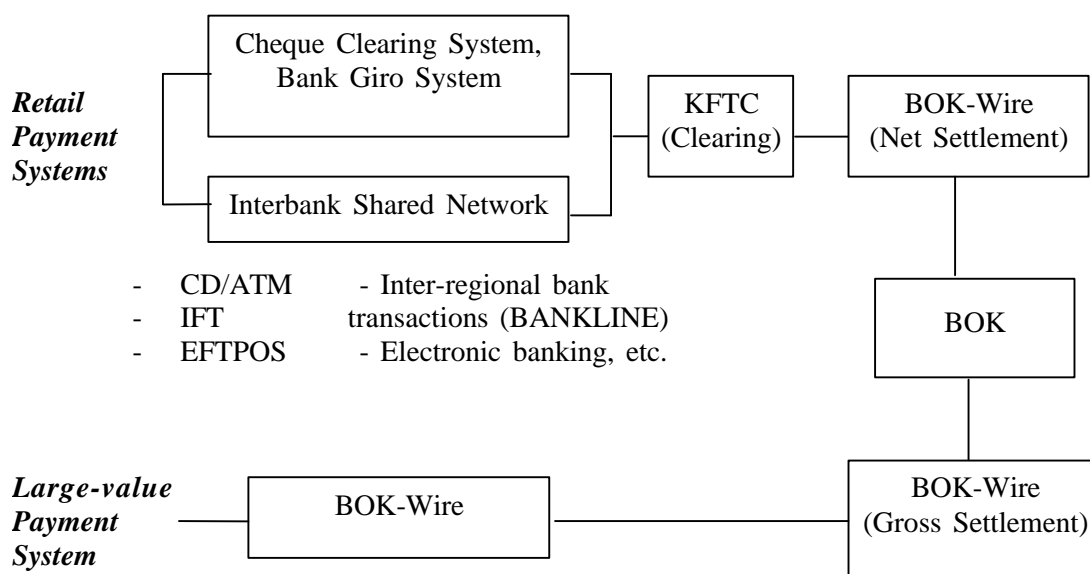
Overview

The Korean interbank settlement system consists of one large-value funds transfer system, BOK-Wire, and ten retail payment systems.

All of the ten retail payment systems that deal with cheques, bank giro, and other electronic small-value payments are under the management of KFTC. They adopt multilateral net settlement, and final settlement is made across the participants' accounts at the BOK on the following business day.

BOK-Wire is owned and operated by the Bank of Korea. It is an online network that connects the BOK with the financial institutions to allow transfer of funds on a real-time gross basis. It provides settlement finality for almost all transactions, from large-value foreign exchange transactions of banks to interbank settlement of individuals' small-value ATM transactions. Settlement value through BOK-Wire accounts for around three quarters of all non-cash payments in Korea. Chart 1 shows the basic structure of interbank settlement systems in Korea.

Chart 1: Structure of Interbank Settlement Systems in Korea



3.1 BOK-Wire

3.1.1 Ownership

The Bank of Korea Financial Wire Network (BOK-Wire), the only real-time gross settlement system in Korea, is owned and operated by the Bank of Korea. The Bank of Korea introduced BOK-Wire in December 1994 to handle large-value funds transfers between banks more efficiently.

3.1.2 Participation

In principle, participation in BOK-Wire is open only to institutions that are eligible to hold current accounts with the Bank of Korea. However, since nearly all financial institutions, such as banks, securities companies, insurance companies and other related institutions, are currently allowed to hold current accounts with the BOK, most financial institutions and some special purpose companies are eligible to participate in BOK-Wire subject to the Bank of Korea's approval. There is no special membership class. Regardless of whether participants are banks or non-banks, the same access criteria are applied and the same level of service except intraday overdraft which is extended only to banks is provided. A remote access to BOK-Wire is not available. As of the end of December 2001, there were 65 banks and 67 non-bank institutions participating in BOK-Wire.

3.1.3 *Type of transactions*

BOK-Wire enables participants to transfer domestic currency funds irrespective of the reasons for payments. It also settles net positions of retail payments such as cheque, bank giro and CD/ATM transactions, and the cash leg of OTC bond transactions on a DVP basis (see section 4.2.3). In addition to domestic currency transfers, US dollar and Japanese yen transfers are available between participants' foreign currency accounts held with the BOK. The *Bank of Korea Act* requires that all banks in Korea maintain reserve balances on their customers' foreign currency deposits with the BOK.² The required reserves are deposited in US dollar or Japanese yen at the BOK foreign currency accounts. A BOK-Wire member bank can transfer US dollars and Japanese yen from its account to other member bank's account through BOK-Wire, without sending a payment instruction to its oversea correspondent bank. In this way reserve account balances are conveniently adjusted between banks with excess reserves and banks with insufficient reserves.

Through BOK-Wire, the BOK deals with settlements related to the BOK's loans, as well as the disbursement and receipt of government treasury funds. In addition, BOK-Wire provides participants with settlement services related to issue, transfer, repurchase, and redemption of government bonds and BOK Monetary Stabilization Bonds (MSBs).

BOK-Wire also provides a third-party funds transfer service for non-participants. Companies and individuals are able to transfer large-value funds (minimum KRW 1 billion per transaction, about USD 0.8 million) to their customers' accounts through BOK-Wire participants.

Although there is no maximum or minimum limit on transaction amounts, except for that on third-party funds transfers, each transaction amount is extremely large, with the average being KRW 14 billion (about USD 11 million); far greater than the average of KRW 2 million (about USD 1,500) for retail payment system transactions.

3.1.4 *Operation of the system*

The online operating hours of BOK-Wire are 9:30 - 17:00 from Monday to Friday and 9:30 - 13:30 on Saturday. The Bank of Korea can extend the operating hours of BOK-Wire if necessary.

3.1.5 *Settlement*

All funds transfers are carried out on a real-time basis and on a gross, trade-by-trade basis. Net obligations of retail payments are settled at two designated times, 11:30 and 14:30, depending on the type of payment. Settlement for cheque payments is designated at 14:30 and settlement for the other retail payments such as CD/ATM, IFT and bank giro at 11:30. Designation of pre-fixed net settlement times for retail payments gives participants more flexibility in managing their funds during the day, thus ensuring smooth settlement operations through BOK-Wire. Once funds transfers and settlements have been made through BOK-Wire, they are irrevocable and unconditional. If a payment is made in error,

² The ratio of required reserves to foreign currency deposits ranges from 1% to 5% depending on the type of customer account. Besides reserve requirements on foreign currency deposits, domestic currency deposits are also subject to the BOK's reserve requirements. The ratio of required reserves to domestic currency deposits is 1-2% for time and savings deposits and 5% for demand deposits. In principle, interest is not paid on foreign and domestic currency accounts at the BOK.

the payer has to ask the recipient to carry out an offsetting transaction.

If the sending banks have insufficient funds in their accounts to cover settlement, their payment instructions are held in a queue in the BOK-Wire system. When sufficient balances are in place, the queued transfers are executed and settled on a by-pass FIFO (First-In, First-Out) basis. Under the by-pass FIFO principle, BOK-Wire attempts to process the first payment instruction in the queue, but if this is not possible owing to lack of funds the next payment instruction is then settled instead.

3.1.6 Risk management

To induce smooth settlements among participants, the BOK extends intraday overdrafts with no interest to a participating bank, which temporarily falls short of settlement funds. The basic ceiling for intraday overdrafts available for a bank is twice its average deposit balance held with the BOK. If a bank needs more than its basic ceiling, it may request the BOK's approval to increase its ceiling. If an intraday overdraft is not redeemed by the end of the same business day, it is automatically converted into a BOK's Temporary Loan with a penalty interest rate (average call transaction rate + 2% points). Banks are required to provide government bonds or Monetary Stabilization Bonds (MSBs) as collateral against intraday overdrafts. Non-bank institutions are not entitled to intraday overdrafts.

Half-day call transactions between participants are available to cover intraday funds' shortages at the designated settlement time for retail payments. A participant anticipating a net debit position in cheque clearing can also arrange the transfer of the necessary funds in advance, with other participants anticipating net credit positions at the designated settlement time.

3.1.7 Pricing policies

The BOK-Wire pricing scheme is based on transaction fees determined by the Bank of Korea. The funds transfer fees are KRW 150 (about USD 0.12) per transaction until 16:00, and KRW 300 (USD 0.23) after 16:00. A fee of KRW 500 (USD 0.4) is levied for cancellation of a pending transaction. There are no admission fees and no annual fees.

3.1.8 Governance

The Monetary Policy Committee (MPC) of the BOK sets up the principal policies of the BOK-Wire system, such as those on access, operation, pricing, risk management and security. The Bank of Korea formulates detailed operational rules in accordance with the MPC's policies, and makes agreements on admission and net settlement with participants in order to specify the rights and obligations of the BOK and participants.

3.2 Cheque Clearing System

3.2.1 Ownership

Like other retail payment systems in Korea, the Cheque Clearing System is owned and operated by the Korea Financial Telecommunications and Clearings Institute (KFTC), owned by member banks.

3.2.2 Participation

There are currently two classes of members in the Cheque Clearing System – direct and indirect. Direct participants clear directly with one another and settle net obligations across their accounts at the BOK. General and associate members of KFTC are entitled to direct participation in the System. Since general and associate memberships are open to banks only, non-banks and banks other than general and associate members are required to obtain the prior permission of the KFTC's general meeting in order to participate directly in the Cheque Clearing System. Indirect participants appoint direct participants as their agents, to clear and settle their cheques on their behalf.

As of the end of December 2001, the Seoul Clearing House had 24 direct participants such as domestic banks and the Post Office, and 1,504 indirect participants such as foreign bank branches and mutual credit facilities.

3.2.3 Type of transactions

Cheques, promissory notes, bills of exchange and other payment documents such as postal money orders and dividend receipts are cleared through 51 clearing houses in Korea.

3.2.4 Operation of the system

The cheque clearing process in the Seoul area is as follows:

Cheques deposited by customers are automatically sorted by reader-sorter machines at the institutions' data centers. Most cheques have an MICR (magnetic ink character recognition) line encoding the detailed information such as the cheque amount and the payee's bank. Cheques are delivered to the Seoul Clearing House for overnight clearing by 1:00 on day T+1. Cheques of institutions without their own reader-sorters are sent to the clearing house by 19:00 on day T to be sorted by the clearing house on institutions' behalves. After exchange of cheques and final verification among participants, the clearing house calculates the net obligation of each institution on a multilateral basis and sends it to the Bank of Korea by 13:30 on day T+1 for final settlement. Meanwhile, by 14:30 on day T+1, the payer's bank should notify the payee's bank of any cheques which are expected to remain unsettled because of insufficient funds on payer's account. From 14:50 on day T+1, the payee's bank allows the payee to withdraw funds on cheques except those expected to remain unsettled. Unsettled cheques are put again in the regular clearing cycle and returned to the payee's bank.

In the Seoul Clearing House, cashier's cheques and some paper-based giro bills are cleared by online transmission of digital information only, without physical delivery, as cheque truncation has been implemented since May 2000 to reduce operating costs. The other clearing houses, where the clearing volumes are relatively small, use manual clearing.

For the sake of more rapid settlement of cheques issued in neighboring regions, mutual clearing between clearing houses is carried out. The 51 clearing houses in Korea are divided into eight area groups, and banks directly exchange cheques drawn on banks of other clearing houses in the same area group by 22:00 on day T. These cheques are cleared together with other cheques presented by banks of the same clearing house.

3.2.5 Settlement

Following the KFTC's notification to the Bank of Korea of participants' multilateral net settlement obligations, the Bank of Korea simultaneously credits and debits participants accounts at the designated time, 14:30 (13:00 on Saturdays) on day T+1.

3.2.6 Risk management

Multilateral netting applied to retail payments in Korea can reduce the size of participants' credit and liquidity risk by lowering the value of payments between participants. However, it could also increase systemic risk by increasing the possibility of one participant's failure causing the failures of other participants.

In order to contain systemic risk, the Cheque Clearing System has collateral arrangements under the control of the BOK. Every participant in this system is required to provide government bonds or BOK MSBs as collateral against its failure. The collateral requirement for each participant is equivalent to 30% of its daily average obligations. In the event of a participant's default, the BOK can sell the participant's bonds or can use them as collaterals against the BOK's lending facilities. If the defaulting participant's collateral is insufficient to cover its settlement shortfall, or a participant is ordered to suspend its banking business by the Financial Supervisory Commission, unwinding can also be applied. Under unwinding, all of the cheques presented by and payable to the defaulting participant are removed from the calculation of participants' multilateral net settlement obligations.

3.2.7 Pricing policies

Participants in the Cheque Clearing System are required to pay annual basic fees and transaction fees based on the volume and value of their transactions.

Banks charge their customers collection fees of about KRW 1,000~10,000 for cheques drawn on banks located in other regions. There is generally no collection charge for cheques drawn on banks in the same mutual clearing region.

3.2.8 Governance

The General Meeting of KFTC, composed of all general members, acts as the supreme decision-making body for all retail payment systems including the Cheque Clearing System. It establishes basic policies on access, pricing, budget, and appointment of KFTC executives. Every member has one vote, and in the case of a tie the chairman, the Governor of the BOK, casts the decisive vote.

3.3 Bank Giro System

3.3.1 Ownership

The Bank Giro System, which was introduced in 1977, is also owned and operated by KFTC.

3.3.2 Participation

Like all other retail payment systems operated by KFTC, the Bank Giro System places restrictions on non-banks' access. Only general and associate members of KFTC are entitled to participate in the Bank Giro System, which means that non-bank institutions and banks

other than general and associate members must obtain the prior permission of KFTC's General Meeting to participate directly in the Bank Giro System. As of December 2001, there were 25 participants in the system, including the Post Office.

3.3.3 Type of transactions

Through its credit and debit transfer services, the Bank Giro System allows any individuals or companies to make use of all bank branches as their paying or receiving windows. In Korea, bank giro, accounting for about 20% of all non-cash retail payments, is the most efficient solution for companies' paying and collecting large volumes of recurring bills.

Credit transfers are carried out in paper-based or electronic form, depending on the type of transaction. Paper-based credit transfers are mainly used for paying specific-purpose bills such as insurance premiums, public utilities charges, regional government taxes, etc. Direct (electronic) credit transfers are used for making payments to large numbers of recipients, such as payroll deposits.

Direct debits allow payees, such as public utilities, insurance and credit card companies, to collect pre-authorized payments automatically from payers' bank accounts at regular intervals.

Meanwhile, KFTC also provides an Internet giro service, or electronic bill presentation and payment service, which is an electronic method of credit transfer for payments of public utilities and tax bills. This service is usually used by large organizations such as insurance and utilities companies, which send out substantial volumes of regularly recurring paper bills. Under the Internet giro scheme, a payee sends KFTC the details of the bills on a magnetic tape or online, and KFTC then posts the bills on its Internet giro web site without mailing paper giro bills to individual payers. Payers confirm the bills on the web site and the amounts involved are then automatically debited from their accounts. KFTC verifies the payments and requests the Bank of Korea to settle interbank net obligations.

3.3.4 Operation of the system

In the case of paper-based credit transfers, giro bills paid by customers are delivered to KFTC on day T. After processing the bills with reader sorters, KFTC sends payment details on a magnetic tape to each payee's bank. Settlement obligations are calculated on a multilateral basis and notified to the Bank of Korea on day T+2.

For direct credits, direct credit notices are first sent by the payer to KFTC on a magnetic tape or a floppy disk at least two days before the due date (T-2). After classifying and grouping all such notices by payees' banks, KFTC sends credit details to the payee's bank on day T-1. Settlement obligations are calculated on a multilateral basis and notified to the BOK for final settlement on day T.

In the case of direct debits, pre-authorized debit details, recorded on a magnetic tape or a floppy disk, are delivered to KFTC by the payee three days before the due date (T-3). On the due date, the debit is posted to the payer's account in accordance with the advice of KFTC. Final net settlement between banks and credit to the payee's account are completed on day T+3.

3.3.5 Settlement

The Bank of Korea posts the multilateral net settlement amount to each bank's account at 11:30 on the settlement date: day T for direct credits; day T+2 for paper-based credits; and day T+3 for direct debits.

3.3.6 Risk management

In order to contain systemic risk caused by a participant's possible settlement failure, each participant is required to pledge government bonds or BOK MSBs equal to 30% of its daily average obligation as collateral. The collateral is under the control of the Bank of Korea. In the event of a participant's default, the BOK can first sell the participant's bonds or can use them as collaterals against the BOK's lending facilities. If the value of the bonds is not sufficient to cover the amount involved, loss sharing among all participants takes place.

3.3.7 Pricing policies

Participants in the Bank Giro System are required to pay annual basic fees and transaction fees based on their usage.

Banks levy fees for bank giro services on corporate customers who pay and collect large volumes of bills. Fees are not levied on individual customers. Giro service fees, set by KFTC, range from KRW 120 to 400 per transaction for paper-based credits, and from KRW 30 to 50 for direct debits. Fees for direct credits have been deregulated and differ among banks.

3.3.8 Governance

Governance arrangements for the Bank Giro System are the same as those for the Cheque Clearing System.

3.4 Interbank Funds Transfer (IFT) System

3.4.1 Ownership

The Interbank Funds Transfer (IFT) System, which was introduced in 1989, is owned and operated by KFTC.

3.4.2 Participation

Regulations on participation in the IFT System are the same as those for the Bank Giro System. As of the end of December 2001, there were 30 participants including the Post Office.

3.4.3 Type of transactions

The IFT System enables a customer visiting a bank branch to transfer funds to a payee holding an account at any bank across the nation on a real-time basis. A customer can use any bank, whether or not he holds an account with it, for funds transfers. IFTs are made on a 'single-payer-to-single-payee' basis for general-purpose payments with irregular frequency, while bank giro is used on a 'from-one-to-many' or 'from-many-to-one' basis for specific-purpose payments with regular frequency. IFT services have a ceiling of KRW 100 million (approximately USD 80,000) per transaction.

3.4.4 Operation of the system

A funds transfer instruction requested by a payer at the bank counter is put in the system by a bank clerk and sent to KFTC, which in turn transmits the instruction to the payee's bank. Upon receiving the instruction, the payee's bank credits the payee's account. The entire process is completed in a few seconds. IFT services are available between 9:30 and 16:30 (13:30 on Saturdays), which corresponds to bank business hours.

3.4.5 Settlement

A payee can withdraw funds immediately once they have been credited to his/her bank account, but interbank settlement is finalized at 11:30 on the next business day. KFTC calculates the multilateral net positions of participants and transmits the details online to the Bank of Korea and participants.

3.4.6 Risk management

Since the IFT System is based on net multilateral settlement like other retail payment systems, a set of risk management arrangements have been set up to reduce systemic risk. The IFT System limits a participant's aggregate net debit, because interbank payment orders are transmitted in real time and payments to customers are made prior to final interbank settlement.

Each participant in the system is required to set its own net debit cap through self-assessment based on its past settlement records, and then collateralize this with Monetary Stabilization Bonds or government bonds. The collateral requirement for each participant is 20% of its net debit cap. The collateral is under the control of the Bank of Korea, and in the event of a participant's default the BOK can first sell the participant's bonds or can use them as collaterals against the BOK's lending facilities. Loss sharing among all participants is carried out if the value of the bonds is not sufficient to cover the default.

3.4.7 Pricing policies

Participants in the IFT System are required to pay annual basic fees and transaction fees based on their usage.

Banks charge their customers for use of the IFT network at their discretion. Fees range from about KRW 500 to 7,500, depending on the remittance amount and the location of the payee. IFT services handled by bank clerks at bank counters have a higher fee scheme than those for other automated funds transfers such as CD/ATM and Internet banking transactions.

3.4.8 Governance

Governance arrangements for the IFT System are the same as those for the Cheque Clearing System.

3.5 Interbank CD/ATM System

3.5.1 Ownership

The Interbank CD/ATM System, launched in 1988, is owned and operated by KFTC.

3.5.2 Participation

The CD/ATM System has the same regulations on participation as the Bank Giro System does. As of December 2001, there were 25 participants, including the Post Office.

3.5.3 Type of transactions

Since cash dispensers (CDs) were first introduced into Korea in 1975 and automated teller machines (ATMs) added in 1984, they have grown to become one of the most popular payment schemes. Especially, the recent increase of unstaffed bank branches has greatly influenced the installations of off-premise CDs and ATMs. At the end of 2000, the number of CDs and ATMs in Korea was 1.02 machines per 1,000 inhabitants, a larger number than in many other countries.³

The nationwide CD/ATM network in Korea supports cash withdrawals, funds transfers and deposit balance inquiries by the cardholders of any member bank. It allows cardholders electronic access to their accounts without the need to visit a bank branch. The network provides this convenience on a real-time basis by linking CDs and ATMs in a shared system and by allowing cardholders from many banks to access accounts from any CDs and ATMs in the network. Funds transfers through the CD/ATM network have a ceiling of KRW 10 million (approximately USD 8,000) per transaction.

3.5.4 Operation of the system

When a cardholder puts a card into an ATM for cash withdrawal, the relevant information is transmitted electronically to the ATM owner. The ATM owner sends the information to the card issuer through KFTC's switching computer. After verifying the information, the card issuer sends an authorization message to the ATM owner via KFTC, enabling the customer to withdraw cash.

The process of an ATM funds transfer is much the same as that of a funds transfer made at a bank counter through the IFT network. A payee is able to withdraw cash from his bank instantly after a payer makes a funds transfer through an ATM. CD/ATM services are available between 8:00 and 23:30 seven days a week.

3.5.5 Settlement

Interbank funds settlement in this system is completed on a net basis at 11:30 on the next business day through the banks' accounts at the Bank of Korea. KFTC calculates the multilateral net positions of participants and transmits the details online to the Bank of Korea

³ According to the Statistics on Payment Systems in the Group of Ten published by the CPSS, the number of CDs and ATMs per 1,000 inhabitants in most of the G-10 countries was less than one machine at the end of 1999. The United States had 0.83 machine per 1,000 inhabitants, the United Kingdom 0.48 machine, Canada 0.87 machine, and Germany 0.55 machine. Japan had the highest number of CDs and ATMs, 1.14 machines per 1,000 inhabitants.

and the individual banks.

3.5.6 Risk management

The risk management arrangements for the CD/ATM System are exactly the same as those applied to the IFT System, i.e. net debit caps, collateralization and loss sharing.

3.5.7 Pricing policies

Participants in the CD/ATM System are required to pay annual basic fees and transaction fees based on their usage.

Banks charge their cardholders CD/ATM service fees at their discretion. There is generally no charge when cardholders use CDs or ATMs owned by their banks. However, cardholders pay transaction fees to their banks when they withdraw cash through CDs or ATMs owned by other network members. Fees vary from KRW 500 to 900, depending on the bank. Cardholders' banks pay interchange fees to the ATM owners for provision of ATM access services to their customers. The interchange fee, determined by KFTC, is currently KRW 300 per transaction.

When cardholders transfer funds through CDs or ATMs to accounts held with other banks, they pay fees ranging between about KRW 500~7,000 to their banks, depending on the amount of the funds transferred and the location of the payee.

3.5.8 Governance

Governance arrangements for the CD/ATM System are the same as those for the Cheque Clearing System.

3.6 Electronic Funds Transfer at the Point of Sale System

3.6.1 Ownership

The Electronic Funds Transfer at the Point of Sale (EFTPOS) System was organized as an interbank network in 1996. It is owned and operated by KFTC.

3.6.2 Participation

The EFTPOS System has the same membership arrangements as the Bank Giro System does. As of December 2001, 19 banks participated in this system and six network companies including KFTC provided network services between retailers and banks.

3.6.3 Type of transactions

The EFTPOS System enables debit-card holders to purchase goods and services from any affiliated retailers by providing them with electronic access at the point-of-sale to their bank accounts. The limits on the amount that a cardholder can spend are KRW 500,000 (approximately USD 400) per transaction and KRW 1 million (approximately USD 800) per day.

3.6.4 Operation of the system

The cardholder presents the card to the retailer and enters a personal identification number (PIN), and the relevant information is then transmitted to the cardholder's bank through the network. The cardholder's bank debits the purchaser's account and returns an authorization to the retailer through the network. In the meantime, the network sends the trade information to KFTC by magnetic tape or online, one day after the trade date.

Debit card services through the EFTPOS System are available between 8:00 and 22:00 everyday including holidays.

3.6.5 Settlement

Although the customer's account is instantly debited at the point of sale through the EFTPOS network, the interbank settlement occurs on a deferred net basis. The interbank net positions are calculated by KFTC, and are then settled across the banks' accounts held with the Bank of Korea at 11:30 on the day after the trade date. After interbank settlement has been completed, the bank transfers the relevant funds to the retailer's account on the same day.

3.6.6 Risk management

The risk management arrangements for the EFTPOS System are exactly the same as those applied to the Bank Giro System, i.e. collateralization and loss sharing.

3.6.7 Pricing policies

Participants in the EFTPOS System are required to pay annual basic fees and transaction fees based on their usage.

Retailers in the debit card network are required to pay 1-2% of the value of each transaction as a merchant service fee to the card issuers. The card issuers, meanwhile, pay 15% of the merchant service fees to the network operators. There is no fee for cardholders.

3.6.8 Governance

Governance arrangements for the EFTPOS System are the same as those for the Cheque Clearing System.

3.7 Electronic Banking System

3.7.1 Ownership

The Electronic Banking System was organized as an interbank shared network in 2001. It is owned and operated by KFTC.

3.7.2 Participation

The Electronic Banking System has the same regulations on membership as the Bank Giro System does. As of the end of 2001, 28 institutions consisting of 25 domestic banks, two foreign banks and the Post Office were participating in this network.

3.7.3 Type of transactions

The Electronic Banking System in Korea supports funds transfers, account information inquiries and loan services, using the telephone and the Internet to communicate customers' instructions to their banks. Customers using IFT or CD/ATM services must visit bank branches, CDs or ATMs during limited operating hours. In the Electronic Banking System, however, customers are able to use services around the clock all year around in their offices, at home and even on the streets, through telephone, mobile phones or personal computers. Funds transfers have a ceiling of KRW 1 billion (approximately USD 800,000) per transaction

In 2001, the number of interbank transfers through the Electronic Banking System averaged around 0.7 million a day, with a value of around KRW 3.3 trillion (about USD 2.5 billion) a day. They represented 3.5% by volume of all non-cash retail payments, and 8.3% by value.

With the tremendous growth of Internet access in Korea in recent years, all banks are encouraging the use of Internet banking through assessing cheaper service fees to it than to other payment products. In December 2001, around 24 million people, or 56% of the South Korean population, were estimated to have access to the Internet at least once a month. About 9 million Koreans, or more than one-third of these Internet users, used Internet banking services. Daily usage of Internet banking services such as funds transfers and account information inquiries averaged around 3 million.

3.7.4 Operation of the system

In order to use Internet banking and phone banking services, a customer is first required to establish an electronic banking agreement with that bank. An Internet banking user must obtain a digital certificate from a certification authority through the Internet. A digital certificate is an electronic file which identifies the real user in all Internet transactions, such as Internet banking and e-commerce. Internet transactions made with digital certificates have legal validity in Korea under the *Digital Signature Act*. Phone banking services do not require digital certificates.

Like with other electronic retail payments, funds transfers in the Electronic Banking System are made on a real-time basis. The entire process of funds transfer is the same as those in IFT and CD/ATM transactions. The system operates around the clock. Some banks, in fact, provide 24-hour electronic banking services.

3.7.5 Settlement

Although the customer's account is instantly debited and credited upon delivery of the payment instruction, interbank settlement takes place on a deferred net basis. The Bank of Korea settles the interbank net positions for funds transfers done by 23:30 at 11:30 on the day after the trade date.

3.7.6 Risk management

The risk management arrangements for the Electronic Banking System are exactly the same as those applied to the IFT System, i.e. net debit caps, collateralization and loss sharing.

3.7.7 Pricing policies

Participants in the Electronic Banking System are required to pay annual basic fees and transaction fees based on their usage.

Banks charge their customers transaction fees for electronic banking services. Most banks currently levy a fixed fee of KRW 300 - 1,000 per transaction on funds transfers. To encourage less costly transactions, some banks do not charge any fees on their Internet banking services.

3.7.8 Governance

Governance arrangements for the Electronic Banking System are the same as those for the Cheque Clearing System.

3.8 Other retail payment systems

The Cash Management Service (CMS) System, established in 1996, supports companies' large-volume and small-value funds transfers. The CMS System enables a company with several accounts in more than one bank to make and receive a number of payments electronically through its accounts, and to produce multi-banking reports. Interbank settlement is carried out through the BOK account on a multilateral net basis at 11:30 on the settlement date.

The BANKLINE System, an inter-regional bank network established in 1997, allows customers access to all regional banks across the country. Customers of regional banks are able to withdraw cash from and deposit cash to their accounts at any regional bank, and remit funds to any other regional bank. For inter-regional bank settlements, the Bank of Korea posts the multilateral net settlement amount to each bank's account at 11:30 on day T+1.

The Electronic Money System, established in 2000, supports clearance of interbank settlement obligations arising from K-CASH payments for goods and services. Under the System, payments to retailers and multilateral net settlements between banks are made on the following business day.

The E-Commerce Payment Gateway, established in 2000, is a shared network for settlement of interbank obligations arising from Business-to-Consumer transactions over the Internet. Arrangements for payments to retailers and interbank settlements are the same as those for the Electronic Money System.

3.9 Major projects and policies being implemented

3.9.1 Development of e-money

A few kinds of e-money have been developed in Korea, in the form of stored-value cards. K-CASH, the first e-money with an embedded IC chip containing encrypted card information, was initiated by KFTC, banks and credit card companies, and experiments with its use were launched in some regions in Korea in 2000. Another e-money, the Mybi card, was introduced by a regional Korean bank. Its pilot project was begun in 2000 in Pusan, a regional city in Korea, and is being expanded into the field of transportation. Mondex Korea, a subsidiary of MasterCard Corp, launched the Mondex card scheme in 2000, in which chip-to-chip funds

transfers are available. Other private sector companies are also planning to develop e-money on a joint business basis. All types of e-money in Korea are issued by commercial banks.

E-money is currently in the pilot stage in Korea, and customer penetration is very weak due to certain reasons, for example, the lack of noticeable advantages of e-money use compared with use of other substitutes such as credit cards and prepaid transportation cards; and high investment costs in the formative stage of the network.

3.9.2 *Discouragement of promissory note usage*

Since promissory notes, as a means of payment, give buyers a financial advantage in that payments can be easily deferred into the future date, they have been used extensively in Korea by large companies which purchase materials and semi-processed goods from small companies. Small and medium companies in Korea are usually at a considerable disadvantage compared to large companies in negotiating the terms of business transactions. Small companies are forced to accept promissory notes with maturity of two or three months for ongoing business transactions with their purchasers.

With all their widespread use, it is true that promissory notes have certain drawbacks as a means of payment. Promissory notes enable buyers, or large companies, to easily pass their financial burden on to sellers, mostly small companies, with no interest. Sellers have to wait until maturity of promissory notes to obtain cash settlement, or cash promissory notes through banks' discounts before the day of maturity. This indicates that sellers bear additional costs after finishing the delivery of goods, such as handling cost and interest cost. Also, since a promissory note can be signed over to others with endorsement, default by an original issuer of a note can result in successive defaults of all users involved in the note's circulation. Moreover, promissory notes cause financial institutions considerable handling costs for issuance, collection and storage. In this context, a couple of arrangements have been developed to discourage the use of promissory notes for non-financial transactions between firms.

The Bank of Korea introduced the corporate procurement loan scheme in 2000. After delivering goods, the seller draws a bill of exchange on the buyer for the full amount of sale, instead of receiving a promissory note, and presents it to the buyer's bank through the cheque clearing process. The buyer's bank then extends the corporate procurement loan to the buyer, who uses this loan to settle the bill of exchange. The seller receives cash shortly after interbank settlement. The buyer's bank charges interest for the loan to the buyer. In order to secure the widespread adoption of the corporate procurement loan scheme, the BOK provides banks with the BOK loan up to half of their total corporate procurement loans.

Another arrangement, the corporate purchasing card scheme, was introduced in 1999 by some commercial banks. A corporate purchasing card is a kind of special credit card used by purchasing firms as a substitute for promissory notes. Its use is limited to purchase of specific goods and services from member firms of the card system. Suppliers can be instantly paid for their goods by the banks.

3.9.3 *Structuring legal framework of electronic financial transactions*

Electronic financial transactions and e-money in Korea are regulated partly by existing laws such as the *Commercial Act* and the *Framework Act on Electronic Commerce*. With recent technological advances, however, especially based on the Internet, these laws are not able to appropriately embrace all aspects of electronic money, e-commerce and participants. The

government is planning to introduce a basic law governing electronic financial transactions, in cooperation with the Bank of Korea, the Financial Supervisory Service, KFTC and other experts. The law is expected to mainly deal with aspects which are not addressed by other laws at present, such as the rights and obligations of users, customer protection, risk control and supervision related to electronic financial transactions, as well as the establishment of Internet banks. The law will also be designed to play the role of a minimum requirement, rather than a strict regulatory tool, in order to accommodate the rapid advance of technology and avoid the drawbacks of over-regulation.

3.9.4 Development of B-to-B e-commerce payment system

In spite of the fact that business-to-business e-commerce in Korea is conducted online over the Internet, because of lack of a shared online payment network available to all banks, most of the settlements take place off-line outside computer networks. In order to provide an interbank payment scheme for B-to-B e-commerce transactions, KFTC is developing an e-commerce payment network, which is scheduled to be put into operation in early 2002. Electronic bills will be available as a means of payment at the outset of operation, and billing and settlement for them will be made online over the network. An electronic bill is issued to a seller by a buyer through its bank and then is registered in an electronic form at KFTC to guarantee the existence of the bill. The seller can hold the bill until it matures, or borrow money on the security of the bill from its bank. Electronic bills are expected to reduce the use of promissory notes (see section 3.9.2). Corporate purchasing cards and corporate procurement loans will be also adopted as available payment methods for B-to-B e-commerce in the near future.

4. Securities settlement systems

Introduction

In Korea, securities clearing and settlement are carried out separately for different types of securities traded in three markets: the Korea Stock Exchange (KSE), the Korea Securities Dealers Association Automated Quotation (KOSDAQ) and the over-the-counter (OTC) markets.

Stocks are traded mainly on two highly organized markets: the KSE and the KOSDAQ.⁴ The cash legs of stock transactions on the two markets are settled in commercial bank money, and the securities legs on a Korea Securities Depository (KSD) book-entry basis. Multilateral netting is used and final settlement is conducted two days after the trade date (T+2).

⁴ Besides the two stock exchanges, a third stock market named the OTC Bulletin Board market was officially opened in 2000 to ensure fairness in the trading of OTC stocks that are not listed on the KSE or the KOSDAQ. Securities companies direct bid-offer prices to the OTC Bulletin Board trading system, which matches the orders between potential counterparties. Settlement is done on a bilateral net basis on day T+2 through book-entry transfer by KSD. The market is still in an early stage, and its trade turnover, about KRW 350 million (about USD 0.3 million) a day, is small compared with those in the other markets.

In addition, an Electronic Communication Network (ECN) was introduced in December 2001 as an alternative trading system to the regular markets. Its trading hours are from 16:30 to 21:00. Stocks listed on the KSE and KOSDAQ markets are traded at the closing prices made in the two markets.

Although bond trading in Korea is available in both the KSE and OTC markets, more than 95% of bond trades are carried out in the latter. The OTC market is an unorganized market where various types of bonds, such as government bonds, corporate bonds and financial bonds, are traded between institutional investors. Bonds traded in the OTC market are settled on a DVP basis in central bank money or on a free-of-payment delivery basis in commercial bank money, on a trade-by-trade basis on the trade date (T+0).

KSD acts as operator of the settlement systems for stocks and bonds traded in the KSE, the KOSDAQ and the OTC markets, providing book-entry transfer and centralized depository services.

Table 3 summarizes the structure of securities settlement in Korea.

Table 3: Structure of Securities Settlement in Korea

	Stocks	Bonds	
Market	KSE, KOSDAQ	KSE (IDM ¹ , GBM ²)	OTC
Clearing entity	KSE market: KSE KOSDAQ: KSD	KSE	-
Settlement/ depository entity	KSD	KSD	KSD
DVP model	Model 3	Model 3	Model 1 or free-of-payment delivery
Settlement funds	Commercial bank money	IDM: central bank money GBM: commercial bank money	Central bank money, or commercial bank money
Settlement date	T+2	T+0	T+0
Method of Settlement	Multilateral netting	multilateral netting	gross settlement

1) Inter-dealer Market where government bonds only are traded between authorized dealers.

2) General Bond Market where all types of bonds are traded.

4.1 Stocks

4.1.1 Trading

4.1.1.1 Market overview

The Korean stock market is divided into two separate exchanges – the KSE and the KOSDAQ markets. The KSE market commenced trading with only 12 listed stocks in 1956, and has currently grown into the largest securities market in Korea, dealing with various types of securities and market index derivatives. In 2001, 690 companies were listed on the KSE stock market, and more than 400 million shares, with a value of around KRW 1.8 trillion (around USD 1.4 billion), were traded each day.

Korea

As a second stock exchange in Korea, the KOSDAQ market was established under management of the Korea Securities Dealers Association in 1996, through reorganization of the existing OTC stock market into a more systematic market. The KOSDAQ market has grown rapidly to support high-tech companies and small and medium-sized enterprises in raising long-term funds effectively. In 2001, the average daily turnover in the KOSDAQ market was KRW 1.8 trillion, showing the same value as in the KSE market. As of the end of December 2001, 721 companies were listed on the KOSDAQ market.

4.1.1.2 Trading system

KSE Market

The Korea Stock Exchange (KSE) market is open from 9:00 to 15:00, with no lunch break, Monday through Friday. Besides the regular trading session, the KSE operates an after-hour session from 15:10 to 15:40, during which customers trade securities at the closing prices of the day. Customers in the market place orders through member companies by phone, in writing or by way of the Internet. A computerized order-routing system enables securities companies to transmit orders directly to the KSE trading system.

Access to KSE membership is confined to securities companies only, both domestic and foreign. The KSE has two classes of memberships, regular and special. Regular members have both voting rights and claims on the KSE properties, while special members have only the right to use the trading facility. A regular member is required to pay an admission fee based on the net assets of the KSE and a membership premium, while a special member pays a membership premium and an annual membership fee equivalent to one-year interest on deposit of an admission fee. Both types of members also pay transaction fees geared to their daily average transaction values.

The general meeting, which is made up of all regular members, approves admission to KSE membership and sets basic policies on KSE management. The board of directors of the KSE is empowered to establish trading arrangements for the KSE market, concerning such matters as products traded, order placements and matching, along with clearing, settlement and market surveillance. In order to represent the public interest, public directors, appointed from among persons not engaged in the securities business, are also included on the KSE board of directors.

KOSDAQ Market

The KOSDAQ Stock Market, Inc., founded and financed jointly by the Korea Securities Dealers Association (KSDA), the Korea Securities Depository (KSD) and securities companies, operates a virtual trading floor, i.e. a central computer trading system in which transactions are made. The KOSDAQ market is open from 9:00 to 15:00, with no lunch break, Monday through Friday. The entire process of order placement and price matching is the same as that in the KSE market.

The KSDA has responsibility for market management, market surveillance, listing examination and corporate disclosure. Participation in the KOSDAQ market is granted to regular and special members of the KSDA only, i.e. domestic and foreign securities companies. Regular members have voting rights and claims on assets of the KSDA, while special members do not. Regular members pay admission fees and membership fees based on their trade values. Special members pay admission fees which are one-third of the amount paid by regular members, and also pay membership fees.

The general meeting of the KSDA, the principal governing body, is represented by all members. The board of directors includes public directors to represent the public interest, along with member directors. The KOSDAQ Committee established in the KSDA is empowered to regulate the KOSDAQ market, i.e. approve listing and delisting on KOSDAQ, and conduct surveillance of stock prices, disclosure, settlement, and risk control. The Committee is composed of experts from academic circles and related institutions.

4.1.2 Pre-settlement

Trading confirmation

Since trade orders in both the KSE and the KOSDAQ markets are locked in after being placed to the floor, and trade confirmation and execution occur at the same time, they cannot be canceled. Direct participants, securities companies, confirm their trades within a few seconds after trade execution through terminals linked to the KSE electronic trading system. Trades by indirect participants such as institutional investors are confirmed a few seconds after trade execution through the dedicated terminal, or after the termination of trading on day T+0 by fax or phone.

Clearing

Stocks traded on the two markets are cleared and settled separately through the respective systems. The KSE serves as a clearing house as well as a provider of a market place for stock transactions in the KSE market. After trade confirmation, the KSE nets out securities and funds to be delivered on a multilateral basis, and then sends net settlement data to KSD by day T+1. Multilateral netting of KSE transactions facilitates smooth settlement by reducing each participant's settlement value to about 10% of the trade value.

KSD is in charge of the clearing process for KOSDAQ stocks. The KOSDAQ Stock Market, Inc. transmits trade data to KSD on day T+1, and KSD then nets out securities and funds to be delivered on a multilateral basis and compiles the net settlement data on the same day. In the KOSDAQ market, net settlement reduces the settlement value by more than 95% of the trading value.

4.1.3 Settlement

Settlement cycle

Rolling settlement is used for all stock transactions in the KSE and the KOSDAQ markets. Final settlement occurs at 16:00 two business days after the trade (T+2).

Settlement procedure

Securities and funds are settled simultaneously on a deferred multilateral net basis (i.e. DVP Model 3). Securities are transferred across participants' accounts opened at KSD using an automated book-entry system, and the funds are settled across participants' accounts opened at commercial banks which the KSE or KSD has designated.

Central securities depository

The Korea Securities Depository, as the sole CSD in Korea, provides a depository service for all types of securities including stocks. KSD is a not-for-profit organization having 96

Korea

shareholders as of the end of 2001. The general meeting of shareholders is its supreme decision-making body. Shareholders of KSD consist of users such as the KSE, securities companies, banks, and insurance companies. The board of directors includes public directors to represent the public interest.

There is no special restriction on eligibility for participation in the KSD deposit and settlement system. Foreign financial institutions and depositories as well as domestic securities companies, banks, insurance companies, and pension funds are allowed to participate. All participants pay fees on a usage basis for the KSD's post-trade processing services such as securities deposit and settlement.

While an intraday credit facility against settlement funds shortage is not provided, securities lending and borrowing are available, through brokerage of KSD, to facilitate timely settlement of securities. A securities borrower is required to provide eligible securities or cash as collateral.

Central counterparty

The KSE, which acts as central counterparty in the KSE market, provides trades-guarantee and risk management services for KSE stock transactions. Participants in the KSE market make payment to or collect payment from the KSE accounts in settlement banks. The KSE is required to compensate losses incurred from settlement failures by its members, resulting in centralizing of risk exposure at the KSE.

The KSE employs the Joint Compensation Fund as a risk management safeguard against a member's failure in the KSE market. Every KSE member had been depositing 1/100,000 of its trading value into the Fund from 1974 to 1999, when, with the total amount of the Fund having reached the maximum limit (KRW 100 billion, about USD 77 million), deposits were temporarily suspended. When a settlement default occurs, the amount deposited in the Fund by the defaulting member is to be used first, with the deposits of other members used to cover the remaining losses.

KSD provides central counterparty service for KOSDAQ market participants. Since KSD acts as the counterparty to sellers and buyers, participants make payment to or collect payment from the KSD accounts in settlement banks. When a participant fails to fulfill a settlement obligation, KSD completes the settlement, using the Settlement Stabilization Fund employed by the Korea Securities Dealers Association.

The Settlement Stabilization Fund is similar to the Joint Compensation Fund of the KSE. Every participant deposits 1/100,000 of its trading value into the Fund, until the maximum limit for deposits (set at KRW 100 billion, about USD 77 million) is reached. The current amount of deposits in the Fund was KRW 23 billion (about USD 18 million) as of the end of 2001. When a settlement default occurs, amount in the Fund is to be used first, with all non-defaulting participants then sharing coverage of any remaining losses.

4.2 Bonds

4.2.1 Trading

Market overview

Although the Korea Stock Exchange (KSE) has an inter-dealer and a retail market for bond trades, nearly all bond trades in Korea take place in bulk over the counter between financial institutions.

The OTC market is a wholesale market in which one-to-one trading of bonds between various types of institutional investors is conducted. The value of each trade is considerably large, with the minimum trade amount being KRW 10 billion (about USD 7.7 million) per transaction. Since corporate bonds are issued with different kinds of conditions, they are not suitable for trading in systematic markets such as the KSE. Owing to these, more than 95% of total bond trades in Korea, or about KRW 5 trillion (about USD 3.8 billion) a day, are conducted in the OTC market.

The Inter-dealer Market (IDM) is an organized wholesale market where authorized dealers trade government bonds only with each other. The IDM was established in the KSE in 1999, to upgrade the Korean bond market by providing benchmark yields and underlying products for government bond futures trading. The General Bond Market (GBM), one of the KSE sub-markets, is a retail market in which individual investors can participate to trade all kinds of fixed income securities and convertible bonds through the brokerage of securities companies. In 2001, average daily turnover in the IDM and GBM of the KSE was KRW 64 billion (USD 50 million), representing less than 2% of total bond trading value in Korea.

Trading system

All types of bonds are eligible for trading in the OTC market, regardless of whether they are listed on the KSE. Most trading conditions such as quotation and trading unit are generally agreed by negotiation between seller and buyer, and trading is available at any time of the day. Most institutional investors, such as banks, securities companies, investment trust companies, insurance companies and pension funds, are eligible to participate in the OTC market without any membership requirements.

The IDM and GBM in the KSE have almost the same trading arrangements as the KSE stock market. As systematic markets, they offer competitive trading of listed bonds. Although in principle securities companies only are entitled to participation in the KSE market, access to the Inter-dealer Market (IDM) is in fact open to both banks and securities companies, irrespective of KSE membership, as long as they are licensed as government bond dealers by the FSC.

4.2.2 Pre-settlement

Bonds traded on the three markets are cleared and settled separately through the respective systems. Both the seller and buyer in an OTC bond transaction transmit trade data to KSD and then verify the result of the trade through the KSD electronic system on the trade date. After trade confirmation, KSD sends out a settlement statement to the participants. Participants' settlement obligations are calculated on a gross, trade-by-trade basis without netting, for both securities and cash.

Korea

Bond trades in the IDM and the GBM, which are settled on a multilateral basis, are cleared by the KSE. After trade confirmation, the KSE nets out securities and funds to be delivered on a multilateral basis, and then sends net settlement data to KSD on the trade date.

4.2.3 Settlement

Settlement cycle

Bond transactions are settled on a rolling basis. Final settlement is completed at 16:00 on the trade date (T+0).

Settlement procedure

For settlement of OTC bond transactions, both full DVP settlement in central bank money and free-of-payment delivery are currently available.

The DVP system for OTC bonds was introduced in 1999, to eliminate potential credit risks caused by time lags between funds and securities transfers and by the failures of commercial settlement banks. Under the DVP scheme, settlements of securities and funds are made in real time and simultaneously on a gross, trade-by-trade basis (i.e. on the basis of BIS DVP Model 1). The DVP system is based on a direct link between the securities settlement system of KSD and BOK-Wire of the Bank of Korea. Securities in the seller's KSD account are first restricted from disposal for other purposes, and funds are then transferred to the seller's account via the KSD's account at the BOK. At the same time, the securities held in the seller's account at KSD are transferred to the buyer's account. In the free-of-payment delivery scheme, the securities leg is settled through KSD book-entry, and the cash leg through the BOK or commercial banks separately from the securities transfer. Currently, about 40% of total OTC transactions are settled in the DVP system, and the portion is increasing. The remaining turnover, or about 60% of total OTC bond trades is settled on a free-of-payment delivery basis.

Securities and funds in the IDM and the GBM of the KSE are settled simultaneously on a deferred multilateral net basis (i.e. BIS DVP Model 3). Securities are transferred across participant accounts opened at KSD. In the case of cash settlement, the cash legs of government bond trades on the IDM are settled across participant accounts opened at the Bank of Korea, and the cash legs of other bond trades on the GBM are settled across participant accounts opened at the commercial banks which the KSE has designated.

Central securities depository

KSD serves as a CSD for bonds, just as it does for all other securities. Details on KSD are described in Section 4.1.3 above.

Central counterparty

Like it does in the KSE stock market, the KSE provides central counterparty service in the IDM and GBM of the KSE as well, and also uses the Joint Compensation Fund in the event of a participant's settlement failure. The Joint Compensation Fund is used to ensure timely settlement of all securities traded on the KSE market. Details on the central counterparty service are described in Section 4.1.3 above.

Since OTC bonds are traded one-to-one between buyers and sellers, without a central counterparty, and are settled bilaterally on a gross, trade-by-trade basis, there is no collateral pool against participants' settlement failures. Participants in the OTC bond market manage their credit risk bilaterally, through their choice of counterparty.

4.3 Major projects and policies being implemented

4.3.1 Reconstruction of securities settlement infrastructure

The recent mergers of clearing and settlement agencies in European markets have led to heated discussion about Korea's current settlement arrangements, under which settlements are made separately for different types of securities and different markets. The government is considering reconstruction of the securities settlement infrastructure to improve its efficiency and reduce costs, in the face of the changing European and U.S. markets.

Two highly controversial issues are currently being discussed in Korea: first, consolidation of settlement within a single system encompassing the full range of securities in the KSE and KOSDAQ markets; and second, consolidation of the post-trade processing functions such as clearance, settlement and deposits within a single institution. In the course of discussions, however, severe conflicts among securities-related institutions have come up, and how to design the best consolidated settlement system is still in dispute. There is currently some skepticism as to the possibility of successful reconstruction of the securities settlement infrastructure.

4.3.2 Introduction of DVP in central bank money

Payment in central bank money is increasingly seen internationally as the best settlement practice. Although a form of DVP is provided in the KSE and KOSDAQ markets in Korea, the cash leg of securities transactions is settled in commercial bank money. Because of frequent payment delays by some participants, moreover, it is also true that some settlements are not completed at the designated settlement time (16:00).

In order to conform to the global standards for securities settlement systems, the Bank of Korea has taken the initiative in planning DVP settlement in central bank money for KSE and KOSDAQ market transactions. The BOK is currently discussing preliminary preparations for implementation of DVP through BOK-Wire with the KSE and KSD, and is requesting that the government and the Financial Supervisory Service actively encourage the KSE and KSD to prepare for DVP.

4.3.3 Shortening of settlement cycle

As the U.S. market is moving from T+3 to T+1 settlement, T+1 settlement is expected to become a new best practice in the near future. In spite of the fact that the current settlement cycles in the Korean market meet international standards such as CPSS/IOSCO Recommendations, the Korean market is planning to shorten its stock settlement cycle from T+2 to T+1, in order to reduce settlement risk exposure and maintain its competitiveness.

In 2000, the FSS, KSD, and other industry organizations established a "T+1 Task Force" to address institutional and regulatory requirements for successful transition to T+1 settlement. The introduction of the straight-through-processing system and the global communication procedures and standards are now under consideration to meet earlier processing deadlines.

T+1 settlement for stocks in Korea is scheduled to be achieved by the end of 2005.

5. Role of the central bank

5.1 Provision of settlement facilities

The Bank of Korea provides banks and non-bank institutions with current accounts for funds transfers and final settlement for net obligations cleared between banks. The *Bank of Korea Act* entitles banks and the central government to hold current accounts with the BOK. In addition, the Act states that non-bank institutions are also able to hold accounts with the BOK if they obtain approvals from the Monetary Policy Committee (MPC) of the BOK. Currently, a range of non-bank institutions, such as securities companies, insurance companies, money broker companies, the CSD and the stock exchange, are allowed to have direct access to BOK accounts. Recently, as non-bank financial institutions become involved actively in funds, securities and foreign exchange transactions in the financial market, their needs for direct access to large-value settlement services are increasing. In particular, introduction of DVP in central bank money in the OTC securities market in 1999 led many securities companies to have direct access to BOK settlement facilities.

Access to a BOK account is restricted to corporate bodies only. Individual customers and private non-financial business companies are not permitted to access the BOK settlement facilities. Except for requirement of a corporate body, there are no other explicit requirements for direct access to a BOK account, i.e. minimum asset or payment volume restrictions.

Since only one type of account, a current account, is provided, all of the financial institutions' other transactions, such as deposits and withdrawals of required reserves, are also made through this account.⁵ In principle, interest is not paid on the current account balances. The BOK extends collateralized intraday overdrafts to bank participants to cover temporary shortages of settlement funds. In accordance with the *Bank of Korea Act*, non-bank institutions are not entitled to all types of BOK loans including intraday overdrafts.⁶

The Bank of Korea also issues banknotes and coins as legal tender. The size, design or denomination of banknotes and coins are determined by the MPC, subject to the approval of the government. Banknotes and coins are manufactured by the Korea Minting and Security Printing Corporation, a special purpose company funded by the government.

The Bank of Korea provides a DVP settlement service for OTC bond transactions. The cash leg is settled through participants' and the KSD's accounts at the BOK. The cash and securities legs are settled simultaneously, providing participants with same-day funds without either credit or liquidity risk. Details on DVP of OTC bond transactions are described in Section 4.2.3.2 above.

⁵ All banks in Korea are required to maintain reserve balances equal to 1-2% of time and savings deposits and 5% of demand deposits in their BOK current accounts.

⁶ The BOK can carry out RP transactions with non-bank financial institutions for open market operations, although it cannot provide loans to them.

5.2 Operation of payment systems

The Bank of Korea operates the large-value payment system known as BOK-Wire, while KFTC, a banking industry body, operates the retail payment systems. BOK-Wire ensures real time, final, irrevocable payments between participants. It also provides a third-party funds transfer service for non-participants such as companies and individuals. Details on BOK-Wire are described in Section 3.1 above.

5.3 Operation of securities registration systems

The Bank of Korea does not operate any settlement systems for securities traded in the secondary markets. Instead, the BOK, as an official manager of government bonds on behalf of the Korean government, operates the registration system for government bonds as well as for Monetary Stabilization Bonds (MSBs). Through the registration system, the BOK provides BOK-Wire participants with services such as issuance, transfer, redemption and repurchase of government bonds and MSBs.

According to the New Issue Blanket Deposit (NIBD) provision in the *Securities and Exchange Act*, the real owners of government bonds can request their registration on the BOK's registration book in the name of KSD on their behalf. This is intended to enhance trading convenience and to encourage immediate dematerialization of securities. Under the NIBD scheme, information on transfers of real ownership handled in the KSD settlement system is not sent to the BOK's government bond registration system. Therefore, in order to conduct efficient open market operations in the government bond market, and especially to promptly provide the financial market with liquidity through one-to-one RP transactions with financial institutions in case of financial emergency, the BOK has recently established the linked computer system for detailed information on financial institutions' holdings of securities.

5.4 Oversight

The Bank of Korea operates and manages payment systems insofar as this is related to monetary and credit policies, in accordance with the *Bank of Korea Act*. Since the BOK operates the large-value payment system, its oversight is focused on retail payment systems operated under the management of KFTC.

To maintain the safety of the retail payment systems, which are based on net settlement, the BOK introduced a set of risk management measures under its control in 1997. The BOK sets up and manages the operational arrangements for net debit caps, collateralization and loss sharing, which all participants in the retail payment systems are required to comply with. KFTC, the system operator, regulates all of the other policies of the retail payment systems, such as access, pricing, and system operation. However, the Bank of Korea participates in the decision-making process of KFTC as one of the general members. The Governor of the BOK chairs the general meeting of KFTC and is able to call a general meeting or board of directors meeting of KFTC if necessary. An Assistant Governor of the BOK participates in decision-making related to the operational policies of the retail payment systems, as a member of the KFTC board of directors. In addition, KFTC is required to regularly submit statistics on the clearing and settlement flows of the retail payment systems to the BOK. The BOK evaluates the safety and efficiency of a newly established retail payment system before the BOK allows the system to access BOK-Wire for net settlements of members' obligations.

Korea

The *Bank of Korea Act* stipulates that the BOK can participate on a joint basis in the Financial Supervisory Service's on-site inspections of banking institutions and require the Financial Supervisory Service to examine banking institutions. Through its participation in supervisory services in these ways, the BOK is able to check participants' compliance with payment systems regulations.

STATISTICAL TABLES

Korea

Table 1

Basic statistical data

	1996	1997	1998	1999	2000
Population (thousands) ¹⁾	45,525	45,954	46,287	46,617	47,008
GDP (KRW billions)	418,479	453,276	444,367	482,744	521,959
GDP per capita (KRW thousands)	9,192	9,864	9,600	10,356	11,004
Exchange rate vis-à-vis USD:					
<i>year-end</i>	844.2	1,415.2	1,207.8	1,145.4	1,259.7
<i>average</i>	804.8	951.1	1,398.9	1,189.5	1,130.6

¹⁾ As of July 1.

Table 2

Settlement media used by non-banks

(end of year)

	1996	1997	1998	1999	2000
					KRW billions
Banknotes and coins	15,453	15,448	13,670	19,475	17,636
Transferable deposits	24,089	19,588	21,913	24,900	29,361
Narrow money supply (M1)	39,542	35,036	35,583	44,375	46,997
<i>Memorandum items:</i>					
Broad money supply (M2)	178,312	203,531	258,538	329,317	413,049
Transferable deposits in foreign currencies :	19,063	58,677	37,046	26,069	23,072
Outstanding value on e-money schemes ¹⁾	nap.	nap.	nap.	nap.	nav.
of which:					
<i>on card-based products</i> ¹⁾	nap.	nap.	nap.	nap.	nav.
<i>on network-based products</i>	nap.	nap.	nap.	nap.	nav.

¹⁾ Introduced in 2000.

Table 3

Settlement media used by banks

(end of year)

	1996	1997	1998	1999	2000
					KRW billions
Transferable balances held at central bank ¹⁾	8,830	4,976	4,734	6,254	8,124
Cash reserve held by banks ¹⁾	2,298	1,616	1,770	2,252	2,879
Total	11,128	6,592	6,504	8,506	11,003
of which:					
<i>required reserves</i> ¹⁾	11,112	6,575	6,477	8,477	10,977
<i>free reserves</i> ¹⁾	16	17	27	29	26
Transferable deposits held at other banks	412	391	845	1,192	1,942
<i>Memorandum item:</i>					
Institutions' borrowing from central bank	6,759	10,971	13,884	8,714	7,656

¹⁾ Averages of daily figures.

Table 4

Institutional framework

(end of 2000)

Categories	Number of institutions	Number of branches	Number of accounts	Value of accounts (KRW billions)
Central bank	1	16	715	6,902
Commercial banks	17	4,709	nav.	32,608
Specialized banks ¹⁾	5	1,406	nav.	10,993
Postal institution	1	2,788	nav.	849
Total	24	8,919	nav.	51,352
of which:				
<i>virtual institutions</i>	<i>nap.</i>	<i>nap.</i>	<i>nap.</i>	<i>nap.</i>
<i>branches of foreign banks</i>	43	63	nav.	692

¹⁾ Comprising the Industrial Bank of Korea, the Korea Development Bank, the Export-Import Bank of Korea, the credit and banking sectors of National Agricultural Cooperative Federation and National Federation of Fisheries Cooperatives.

Table 5

Payment instructions handled by selected interbank settlement systems: volume of transactions

	1996	1997	1998	1999	2000
					thousands
Retail systems	2,173,904	2,450,754	2,315,097	2,484,282	2,896,421
Cheques & bills	1,146,626	1,222,191	1,012,463	1,027,172	1,091,782
Bank Giro	648,340	700,121	664,818	636,248	723,941
IFT	197,288	241,991	270,263	320,603	392,112
CD/ATM	177,974	239,517	260,885	324,312	395,645
EFTPOS	660	1,119	1,440	1,892	1,786
CMS	2,826	44,924	103,534	172,717	289,881
BANKLINE ¹⁾	nap.	641	1,464	1,196	1,218
Others	190	250	230	142	56
Large-value system					
BOK-Wire	1,273	1,491	1,425	1,399	1,407

¹⁾ An inter-regional bank network introduced in 1997.

Table 6

Payment instructions handled by selected interbank settlement systems: value of transactions

	1996	1997	1998	1999	2000
					KRW billions
Retail systems	8,149,364	8,517,920	8,808,186	11,449,725	8,986,878
Cheques & bills	7,435,701	7,391,659	7,505,823	9,677,298	6,790,075
Bank Giro	56,692	60,402	55,797	55,194	73,610
IFT	600,525	979,401	1,154,294	1,589,201	1,922,115
CD/ATM	55,672	79,854	80,037	109,972	164,484
EFTPOS	34	57	64	98	106
CMS	668	4,889	8,526	14,582	32,466
BANKLINE ¹⁾	nap.	1,636	3,625	3,368	4,015
Others	72	22	20	12	7
Large-value system					
BOK-Wire	7,277,950	9,496,390	14,290,165	19,975,616	18,840,784

¹⁾ An inter-regional bank network introduced in 1997.

Table 7

Indicators of use of various cashless payment instructions: volume of transactions

	1996	1997	1998	1999	2000
	millions				
Cheques & bills	1,147	1,222	1,012	1,027	1,092
Payments by debit card ¹⁾	0.7	1.1	1.4	1.9	1.8
Payments by credit card ²⁾	153	177	194	275	469
Credit transfers	791	893	893	1,004	1,225
of which:					
Wholesale payments ³⁾	1	1	1	1	1
Retail payments ¹⁾	790	892	892	1,003	1,224
Direct debits ¹⁾	237	336	410	453	579
Total	2,329	2,629	2,510	2,761	3,367

¹⁾ Interbank data only.

²⁾ Bank credit cards only.

³⁾ Credit transfers through BOK-Wire.

Table 8

Indicators of use of various cashless payment instructions: value of transactions

	1996	1997	1998	1999	2000
	KRW billions				
Cheques	7,435,701	7,391,659	7,505,823	9,677,298	6,790,075
Payments by debit card ¹⁾	34	57	64	98	106
Payments by credit card ²⁾	24,262	26,781	22,773	28,469	48,967
Credit transfers	7,979,329	10,604,600	15,571,005	21,721,812	20,995,375
of which:					
Wholesale payments ³⁾	7,277,950	9,496,390	14,290,165	19,975,616	18,840,784
Retail payments ¹⁾	701,379	1,108,210	1,280,840	1,746,196	2,154,591
Direct debits ¹⁾	12,251	17,994	21,458	26,132	42,106
Total	15,451,577	18,041,091	23,121,123	31,453,809	27,876,629

¹⁾ Interbank data only.

²⁾ Bank credit cards only.

³⁾ Credit transfers through BOK-Wire.

Table 9**Transfer instructions handled by securities settlement systems: volume of transactions ¹⁾**

	1996	1997	1998	1999	2000
Stocks ²⁾	7,820	12,172	28,739	78,034	124,835
Korea Stock Exchange	7,785	12,125	28,533	69,359	73,785
KOSDAQ	35	47	206	8,675	51,050
Bonds ³⁾					
IDM ⁴⁾	nap.	nap.	nap.	278,189	20,593
GBM ⁵⁾	1,318	3,876	15,039	10,836	6,285
OTC	nav.	nav.	nav.	nav.	nav.

¹⁾ Indicates total volume of securities traded in the market, not the number of transactions.

²⁾ In millions of share.

³⁾ In KRW billions.

⁴⁾ Inter-dealer Market for government bonds, established in 1999.

⁵⁾ General Bond Market for all types of bonds.

Table 10**Transfer instructions handled by securities settlement systems: value of transactions**

	1996	1997	1998	1999	2000
					KRW billions
Stocks	143,177	163,448	194,452	973,731	1,205,623
Korea Stock Exchange	142,642	162,282	192,845	866,923	627,133
KOSDAQ	535	1,166	1,607	106,808	578,490
Bonds	115,862	143,497	429,530	1,200,290	1,084,943
IDM ¹⁾	nap.	nap.	nap.	280,830	20,447
GBM ²⁾	1,378	4,045	15,489	12,777	6,723
OTC	114,484	139,452	414,041	906,683	1,057,773

¹⁾ Inter-dealer Market for government bonds, established in 1999.

²⁾ General Bond Market for all types of bonds.

Table 11**Number of participants in securities settlement systems**

	1996	1997	1998	1999	2000
Stocks					
Korea Stock Exchange ¹⁾	37	38	40	40	51
KOSDAQ ¹⁾	54	58	51	58	64
Bonds					
IDM ²⁾	nap.	nap.	nap.	62	82
of which:					
Banks	nap.	nap.	nap.	20	29
Securities companies	nap.	nap.	nap.	41	52
Other institutions	nap.	nap.	nap.	1	1
GBM ³⁾	37	38	40	40	51

¹⁾ All participants are securities companies.

²⁾ Inter-dealer Market for government bonds, established in 1999.

³⁾ Participants in General Bond Market are the same as those in stock market of the KSE.